

# Newsletter – July 2018

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## **Tribology outcomes are directly related to temperature.**

In the case of gear oil, as its temperature increases, its ability to support a load decreases. Increased temperature has a thinning effect on oil viscosity while each lubricant will differ in the rate of change. The rate of change is expressed in oil's Viscosity Index (VI) number. The higher the VI number, the lower the rate of change.

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## **ETT – Essential Tribology Terminology**

### **More simple definitions for two of tribology's essential terms**

- ✓ **Foaming** The occurrence of a frothy mixture of air and lubricant that can reduce the effectiveness of the lubricant and result in sluggish hydraulic operation, air binding of oil pumps and overflow of tanks or sumps.
  - ✓ **FZG** - Used in developing industrial gear lubricants to meet equipment manufacturer's specifications. The FZG test equipment consists of two gear sets, arranged in a four-square configuration, driven by an electric motor. The test gear set is run in the lubricant at gradually increased load stages until failure, which is the point at which a 10-milligram weight loss by the gear set is recorded. Also called Niemann Four Square Gear Oil Test.
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## **SAIT TRAINING – Smoothing the path to knowledge**

### **2018 SAIT Training Calendar Dates**

- ✓ **LE 116:** 23 - 27 July 2018, Johannesburg
- ✓ **LE 117:** 27 - 31 August 2018, Cape Town
- ✓ **LE 118:** 8 - 12 October 2018, Johannesburg

Course Fees for SAIT Members: R14 950.00

Course Fees for Non-SAIT Members: R16 675.00

Course Fees for Students (Proof of Student Registration Required): R4 600.00

## ENERGY EFFICIENCY & TRIBOLOGY

### Status of Electrical Energy Efficiency in South Africa

The Academy of Science of South Africa (ASSAf) have released a consensus study on The State of Research, Development and Innovation of Electrical Energy Efficiency Technologies in South Africa. The report commissioned by the Department of Science and Technology (DST), is now available for download.

Although the report focused on efficiency in the electrical supply chain, it included a section on the importance of Tribology in this area. This elevates the status of tribology and the role that this can play in any energy efficiency program. Increased knowledge will result in improved materials and lubricants and a reduction in total cost of ownership. This can only have a positive impact on the economy, while also reducing energy input and cost.

The full report is available at: <http://hdl.handle.net/20.500.11911/93>

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## INTERNATIONAL EVENTS

### 4–7 September 2018 - 45th Leeds-Lyon Symposium on Tribology:

**Smart Tribology Systems**, at Leeds Trinity University, Leeds, UK

*Please take the time to explore the symposium website Leeds-Lyon 2018*

<https://engineering.leeds.ac.uk/leeds-lyon-conference>

**17-20 September, 2018 – Malaysia: ASIATRIB 2018:** the mega event in the series of International Tribology Conferences under the auspices of the Asian Tribology Council (ATC), the apex body of national tribology society of Asia Pacific countries. See the prospectus at:

[http://asiatrib2018.mytribos.org/PDF/ASIATRIB2018\\_prospectus.pdf](http://asiatrib2018.mytribos.org/PDF/ASIATRIB2018_prospectus.pdf)

### 28-31 October 2018 – Chicago, Illinois, USA – 2018 STLE Tribology Frontiers

**Conference (Co-sponsored by ASME Tribology Division):** Join tribology researchers from more than 25 countries in North and south America, Asia and Europe for the 2018 STLE Tribology Frontiers Conference (TFC) to be held October 28-31 October 2018, at the historic Drake Hotel in downtown Chicago. Co-sponsored by the Tribology Division of the American Society of Mechanical Engineers (ASME). The TFC's focus is the role tribology plays as the interface of physics, chemistry, materials science and mechanical engineering. The conference will feature three keynote speakers who will present talks on areas at the forefront of tribological science, and include technical sessions featuring submitted presentations from leading tribology researchers and institutions from around the world. Go to <https://www.stle.org/TribologyFrontiers> for further information.

**2 April 2019 – UNITI Mineral Oil Technology Congress – Stuttgart, Germany:**

[www.umtf.de](http://www.umtf.de)

## **DID YOU KNOW? –‘A tribological tip-trip’**

### **Air is the Enemy**

In its origin deep beneath the earth's surface, oil endures the ravages of millions of years. Despite the heat and exposure, one contaminant is generally missing from its environment, preventing degradation. This, of course, is oxygen. Without air, lubricating oil would not need many of the additives so common in modern formulations. Anti-oxidants, rust inhibitors, corrosion inhibitors, and over-based additives all battle the consequences of oxidation—some proactively, others reactively.

While it is a bit too much to expect lubricants to "last forever," there is every reason to expect them to perform better and last longer—much longer. See Lube Tips – <http://www.noria.com/>

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## **TRIBOLOGY & FRAUD**

As fuel heads toward R17/litre, becoming an even more negotiable commodity, the price of lubrication follows in its wake. Here are a few common malpractices for lubricant loss and increased wear on fleet drivelines:

- False claims by unbranded products;
- Counterfeit packaging – counterfeiters are getting better at this and the problem is reported to be growing in countries with emerging economies – including South Africa.
- Friction modifiers – snake oil doctors – false claims.
- Poor stock control and theft is common.
- Substitution of high grade lubricants with used oil or inferior products – *motorists and fleet owners must ensure that the seal on a new topping-up can of oil is broken in their presence.*
- Deliberate over-filling – to increase lubricant turnover.
- False reading of dipstick levels to ‘skim’ the extra lubricant left when the dipstick indicates the correct level.
- Bribery, corruption and collusion
- Any truck fleet will need a clear policy on how lubricants will be purchased, stored and dispensed to provide the basis for training, control and disciplinary action. There is currently a lack of lubrication policies.

Reference: Auto Engineering & Spares March/April 2009 page 50

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## **PARTING SHOT**

### **Nitration – it is bad and complex**

Engine combustion chambers provide one of the few environments where there is sufficient heat and pressure to break down the atmospheric nitrogen molecule into two atoms that can react with oxygen to form nitrous oxides (NOx). Nitration is a degradation of the oil that results from a reaction of the oil with gaseous NOx created during combustion.

Nitric oxides react with water to form nitric acid. The formation of nitric acids can lead to a corrosive environment to exposed engine surfaces. Nitration also leads to the formation of deposits and sludge. Here are factors affecting excessive nitration:

- Exhaust gas scavenging efficiency
- Cylinder wall temperature
- Piston ring efficiency
- Crankcase ventilation
- Oil sump temperature
- Base oil type
- Rate of oil makeup
- Spark timing
- Air/fuel ratio
- Load

Avoid the trap of rapid assumption!

For details please visit: <https://www.machinerylubrication.com/Read/30020/engine-oil-nitration>

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